

10: BUILDING A FOOD WEB

Grade Level: K-5

Time: 45 min-1 hour

SUMMARY:

In this activity, students receive organism cards and create a food web using yarn or string. Students then illustrate how species loss could impact the food web.

Note: There are enough cards for 18 students

OBJECTIVES:

Students will:

- Illustrate interactions between ocean organisms by creating a food web.
- Learn about the importance of these connections and how the removal of one or more organisms can impact the entire food web.

STEM APPLICATIONS:

- **Science (Ecology)** – Students learn about predator-prey interactions in marine ecosystems and how they impact the health of an ecosystem.

NGSS ALIGNMENT:

- **Practice 1.** Asking Questions and Defining Problems
 - **K-2** - Ask questions based on observations to find more information about the natural and/or designed world(s).
 - **3-5** - Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
 - **3-5** - Ask questions about what would happen if a variable is changed.
- **Practice 2.** Developing and Using Models
 - **K-2** - Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller) and/or patterns in the natural and designed world(s).
 - **3-5** - Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.

VOCABULARY:

Ecosystem – A community of living things, non-living elements, and their interrelationships.

Producer – An organism that can produce its own food.

Consumer – An organism that gets its energy by consuming, or eating, other organisms.

Herbivore – An organism that consumes only plants.

Carnivore – An organism that consumes only animals.

Omnivore – An organism that consumes both plants and animals.

Decomposer – An organism that breaks down the remains of

dead plants and animals.

Food Chain – A way to show how energy passes from one organism to another.

Food Web – A series of food chains that are connected to one another.

Biodiversity – The variety of life in the world or in a particular habitat or ecosystem.

Threatened Species – A species that is likely to become endangered.

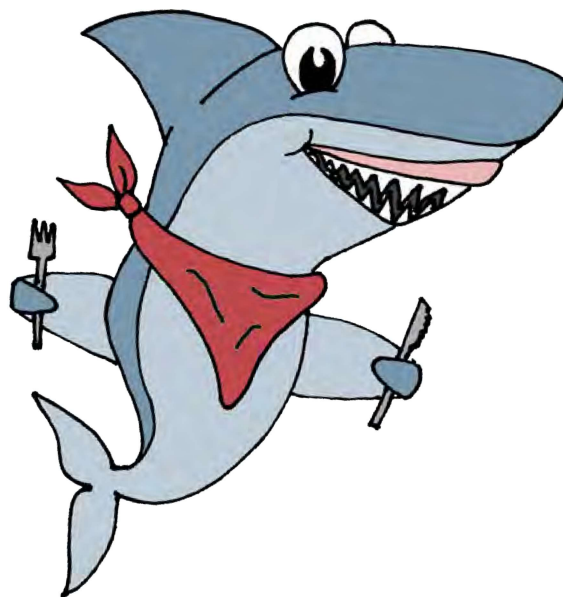
Endangered Species – A species that is seriously at risk of extinction.

MATERIALS:

- NAMEPA Food Web Cards
- Tape
- Ball of string/yarn
- Scissors

BACKGROUND:

Healthy, well-balanced ecosystems are made up of many interacting food chains called food webs. In most ecosystems, organisms can obtain food and energy from more than one source, and commonly have more than one predator. A food web is one way of representing predator-prey relationships and the energy flow in a system. Looking at a food web is a great way to see the interactions between organisms and how these connections determine the health of an ecosystem. If there is an imbalance, every organism in the food web is affected. This lesson is a great way of showing how every organism plays an important role in maintaining the health of an ecosystem.



ACTIVITY:

1. Engage/Elicit

To begin this activity, ask the students if they can define “food chain.” After they’ve answered and you have gone over the definition, ask them what a food web is. Explain that a food web is just a combination of food chains, and ask the students what they think some components of a food chain are. Answers include the sun, primary producers, consumers, decomposers, etc. Explain that producers (plants) receive their energy from the sun, consumers receive their energy from producers or other consumers, and decomposers feed on dead plants and animals. Explain to the students that they will be creating a food web with the NAMEPA food web cards and string/yarn.

2. Explore

Have the students stand in a circle and hand out an organism card to each student, telling them to take note of what type of organism they are, their predators, what they eat, and if they are threatened or endangered (only a few cards mention this). Explain what it means to be a threatened or endangered species. Have the students tape the card to the front of their shirt.

Note that one student’s organism card represents humans. Explain that at any point, a student can also pass the string/yarn to the student who has this card, as humans can be a threat to any of the organisms on the food web. This may be due to fishing, habitat loss, climate change, etc. Explain that humans may impact food webs by decreasing numbers of certain species.

One student (or leader) can play the role of the sun. The sun can transfer energy only to the producers. This person will start the food web by handing the string/yarn to one of the producers. The producer will then hand the string to an organism that eats them. The food web has now begun! Each organism must toss the string/yarn to another organism to represent the transfer of energy. Be sure that the students hold on to the string every time it comes to them, and have them say the name of the organism they are throwing to before they toss it. At any point, an organism can toss the string/yarn to bacteria, and that student can toss it to any of the producers. Remind students that decomposers like bacteria release nutrients into the water that facilitate the growth of producers, making a complete cycle.

After every student has gotten the string at least once, dis-

cuss what you see. One way to initiate this discussion is to run through one or two complete chains. After the discussion, have the students who are listed as “threatened” or “endangered” (the blue whale, emperor penguin and albatross) cut their pieces of the string/yarn in the food web and sit down. Another way to demonstrate stress on the food web is by tugging on one part and seeing how many students can feel the tug.

Note: An alternative way to use the organism cards is by having students make different food chains by stacking the cards on top of one another.

3. Explain

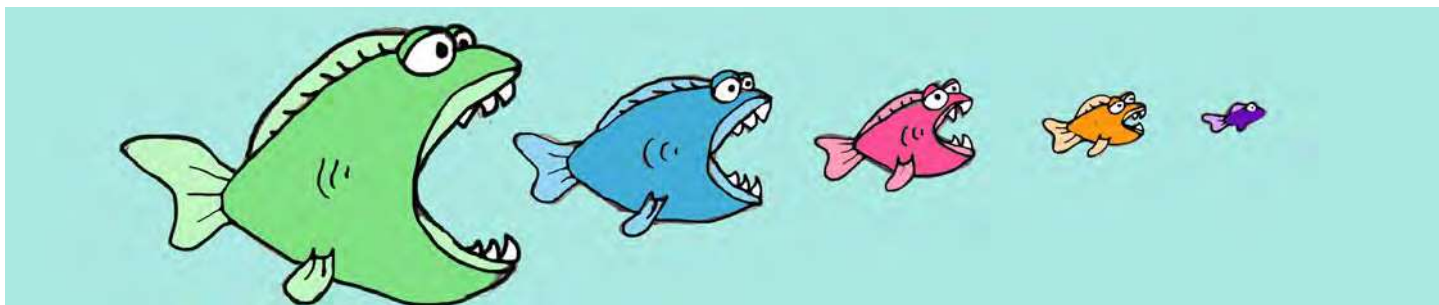
Ask the students some things they notice. What happens to the food web when the threatened/endangered species are no longer apart of it? You can mention that if certain herbivores and omnivores were removed, producers would probably start to flourish, and top predators would start to dwindle because they would not be able to find enough food. Ask students, “What organisms would have the greatest impact if removed?” A good answer to that question would be producers, because they are at the very bottom of the food chain – without them, the food chain would collapse. Explain to the students that every organism plays an important role in the food web.

4. Evaluate/Wrap-up

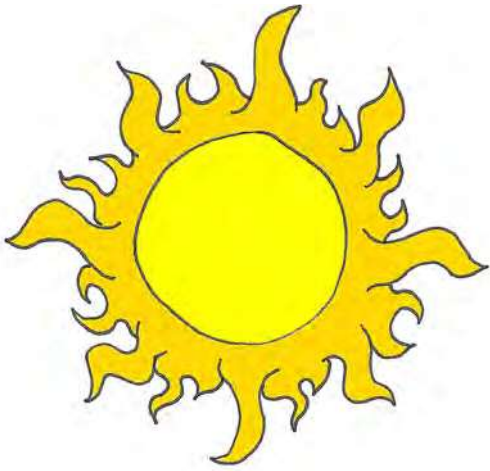
End this activity with a discussion about ecosystems and the importance of biodiversity. The more biologically diverse an ecosystem is, the more resilient it is – in other words, it can better respond to change (i.e. a storm, climate change, etc.). A simple way to explain this is that when there are more organisms in a food chain or food web, it will be less affected if one organism in that chain or web becomes threatened or endangered. When there are fewer organisms in that chain, the opposite is true. Another point to stress is that humans do not completely understand the complexity of ecosystems and how our actions are affecting the world’s ecosystems.

5. Dive Deeper

This lesson is adapted from a lesson published in *Immersion: Secrets of the Gulf* by the Sea Research Foundation. To find out more about marine ecosystems, visit www.namepa.net/education.



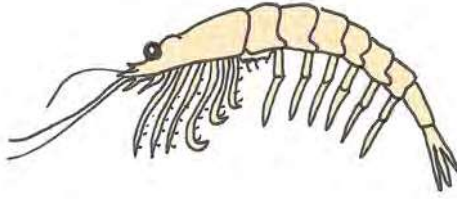
SUNLIGHT



Provides energy to Producers through photosynthesis

KRILL

Consumer



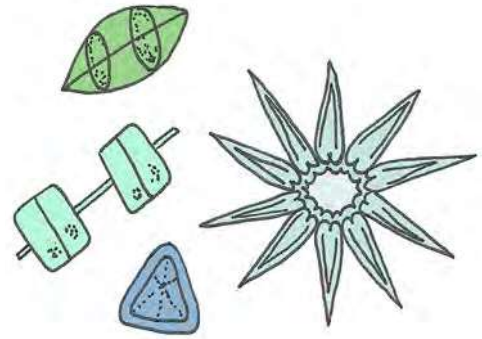
What they are: Small shrimp-like crustaceans

What they eat: Phytoplankton, Algae

What eats them: Jellyfish, Emperor Penguin, Squid, Silverfish, Toothfish, Petrel, Crabeater Seal, Blue Whale

PHYTOPLANKTON

Producer



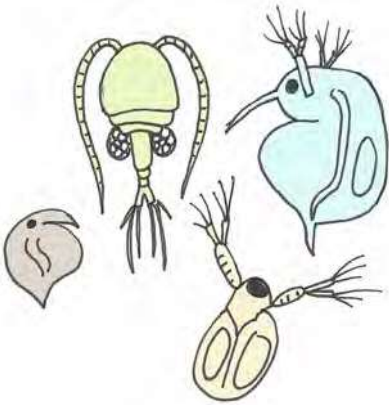
What they are: Tiny organisms that drift in the water and make their own food

What they eat: Nothing

What eats them: Zooplankton, Krill

ZOOPLANKTON

Consumer



What it is: Tiny organisms that drift in the water and feed on other plankton

What it eats: Phytoplankton

What eats them: Krill

ALGAE

Producer



What they are: Plant-like organisms that make their own food

What they eat: Nothing

What eats them: Zooplankton, Krill

JELLYFISH

Consumer



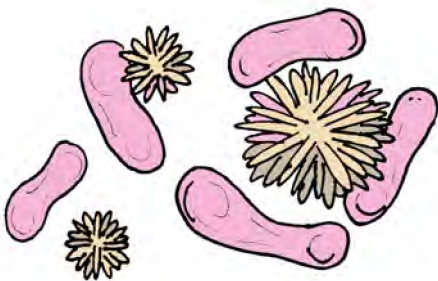
What it is: A free-swimming marine animal shaped like an umbrella that has stinging tentacles

What it eats: Krill, Zooplankton

What eats them: Albatross, Squid

BACTERIA

Decomposer



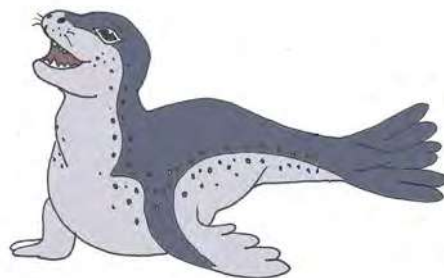
What they are: Tiny organisms that break down dead plants, animals and other organisms and release nutrients into the water

What they eat: Anything that has died

What eats them: Nothing

LEOPARD SEAL

Consumer



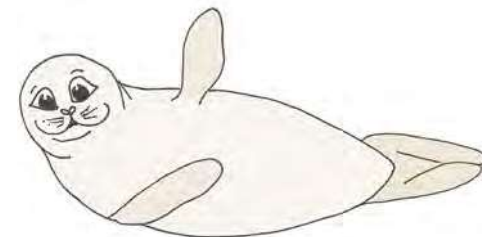
What it is: A marine mammal that feeds on other animals

What it eats: Squid, Antarctic Silverfish, Emperor Penguin, Crabeater seal

What eats it: Orca

CRABEATER SEAL

Consumer



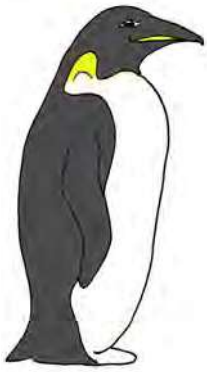
What it is: A marine mammal that feeds on other animals

What it eats: Krill, Squid, Silverfish

What eats it: Leopard seal, Orca

EMPEROR PENGUIN

Consumer



What it is: A flightless seabird

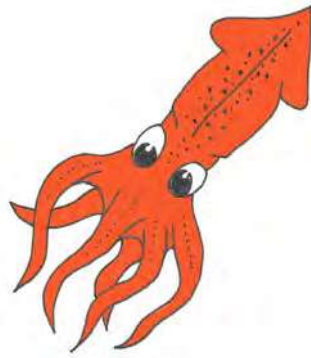
What it eats: Krill, Silverfish, Squid

What eats it: Leopard Seal, Orca

Status: Threatened

SQUID

Consumer



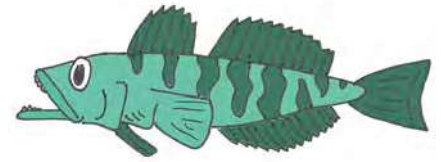
What it is: A fast-swimming mollusk that has tentacles

What it eats: Krill, Zooplankton

What eats it: Toothfish, Emperor Penguin, Crabeater Seal, Leopard Seal

ANTARCTIC TOOTHFISH

Consumer



What it is: A large fish found in the Southern Ocean

What it eats: Silverfish, Squid

What eats it: Leopard Seal, Orca

ORCA

Consumer



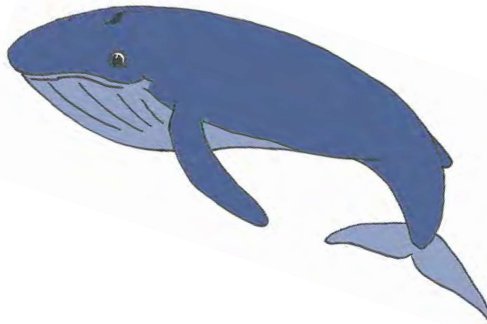
What it is: A toothed whale with black and white markings

What it eats: Silverfish, Toothfish, Squid, Leopard Seal, Emperor Penguin, Blue Whale

What eats it: Nothing

BLUE WHALE

Consumer



What it is: Large marine mammal found in all oceans

What it eats: Krill

What eats it: Orca

Status: Endangered

ANTARCTIC SILVERFISH

Consumer



What it is: A type of fish native to the Southern Ocean

What it eats: Krill, Zooplankton

What eats it: Petrel, Albatross, Toothfish, Orca

ANTARCTIC PETREL

Consumer



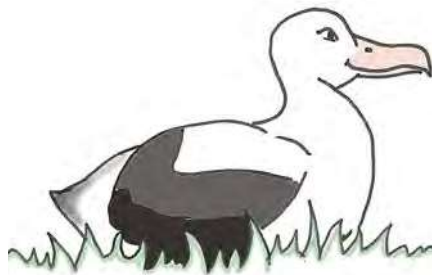
What it is: A seabird

What it eats: Krill, Silverfish, Squid

What eats it: Nothing

WANDERING ALBATROSS

Consumer



What it is: A large seabird

What it eats: Squid, Silverfish

What eats it: Nothing

Status: Threatened

HUMANS

Consumer



What we are: Mammals that have no natural predators

Threat to: All organisms through fishing, boating, climate change, etc.

Predators: None